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Stachys matthewsii: Photo essay of a rare plant

Article and images by W. John Hayden, Botany Chair

Figure 1. Node below inflorescence; petioles less than half the length of leaf blades and hairs on the four stem angles but not on the flat stem surfaces are two important vegetative characters useful for identification of *Stachys matthewsii*.

On the morning of June 14, 2021, while collecting bryophytes in Goochland County with my student, Mikayla Quinn, we stumbled across a previously unknown population of *Stachys matthewsii*, Yadkin's Hedge Nettle. Because this plant is globally rare, I will not share location information beyond the fact that we were on the flood plain of Tuckahoe Creek in the southeast portion of the county. Confirmation of the identity of our find was provided by Gary Fleming, one of the three authors who named this rare mint as new to science (Fleming et al. 2011). Given its occurrence in just a few locations in Virginia and North Carolina, few members of VNPS will ever be able to view this intriguing species firsthand. Here, I share some photos of this rare element of the Virginia Flora.❖

Figure 2. Crenate leaf margins, as opposed to entire or serrate/serrulate, provide another cue for identification.

Figure 3. Inflorescence in the form of verticils arising from the axils opposite bracteal leaves is found in many members of the mint family.

Figure 4. Calyx and corolla from an uppermost inflorescence verticil; deltate calyx lobes with an acuminate apex provide additional characters for identification.

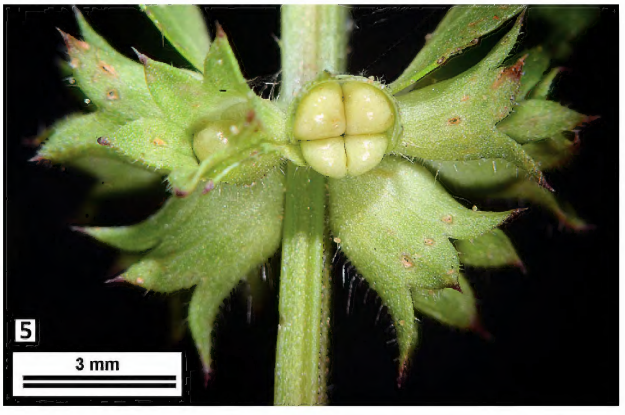


Figure 5. Fruiting calyces, with one calyx cut to reveal the four one-seeded nutlets, a fruit form that is widespread in the mint family; also, deltate/acuminate sepal tips are clearly shown.

LITERATURE CITED

Fleming, G. P., J. B. Nelson, and J. F. Townsend. 2011. A new hedge-nettle (*Stachys*; Lamiaceae) from the mid-Atlantic piedmont and coastal plain of the United States. Journal of the Botanical Research Institute of Texas 5: 9-18.

Embracing Diversity
Anna Finch's vision for an inclusive natural world

Anna Finch

Anna Finch is a dedicated Park Ranger and engaged member of the Shenandoah Chapter of the Virginia Native Plant Society (VNPS). She is also an active member of the organization's Diversity, Equity, Inclusion, and Justice (DEIJ) committee. She lives in the heart of some of Virginia's most stunning landscapes. Her conservation journey stems from a deep-rooted love for nature and a commitment to fostering inclusivity within the community.

Anna's father was a General Schedule (GS) Federal Employee. These workers often move as frequently as military families would, providing a wider lens for youth as they travel the country and, in some cases, the world. Anna experienced the richness of various cultures and environments as she moved between Japan, Spain, and Hawaii. Yet, it was in Virginia, with its diverse ecosystems, that her passion for the natural world truly blossomed. Encouraged by her parents to explore the creeks and beaches of Virginia Beach, Anna's evolution from a curious child to a devoted conservationist unfolded organically. When she moved to Alexandria, Virginia, from Hawaii, her quest for local natural areas led her to Huntley Meadows Park, where she first volunteered to protect and restore what she loved.

Anna believes introducing young people to nature is vital, especially given their diverse backgrounds. "When kids connect with nature, they are connecting with a deeper part of themselves," she reflects, appreciating the wonder she sees in children as they discover the world around them. She finds fulfillment in being part of organizations like VNPS, which nurture relationships with nature and foster an understanding of our environment's value.

Diversity, equity, inclusion, and justice are crucial components of Anna's vision for the VNPS. "We need many different life experiences to enrich our understanding of the world," she emphasizes. For Anna, nature is a space where everyone should feel safe and experience a welcome sanctuary for healing and unity. She is acutely aware of the barriers that underrepresented communities face in engaging with conservation, particularly a lack of access and historical contexts that can hinder feelings of safety in natural spaces. Through her work, she aims to foster a culture of inclusivity that resonates with the unique challenges people face.

Anna actively engages her local community to bridge gaps in understanding and appreciation for nature. Inspired by President Barack Obama's grassroots approach, she prioritizes relationship-building with her neighbors, especially when discussing landscaping practices that can benefit local ecosystems. By initiating conversations about different ways her neighbors can care for their land, she hopes to create a sense of shared responsibility for the environment.

Anna's work with young people is also critical to her mission. Through her outreach to local schools, she shares her love for native plants, nurturing curiosity and a sense of stewardship in the next generation. "It's truly rewarding to witness that spark of excitement in young people," she notes, conveying her belief that building these connections is essential for future generations.

The mission of VNPS aligns seamlessly with Anna's philosophy: that forming meaningful relationships with nature enriches our lives and fosters a sense of responsibility towards it. "If we don't establish a connection with nature, we might overlook its value," she explains, drawing on wisdom from *Braiding Sweetgrass* by Robin Wall Kimmerer. The intricate ecosystems thrive around us, and Anna is devoted to educating others about this interdependence through her actions and outreach.

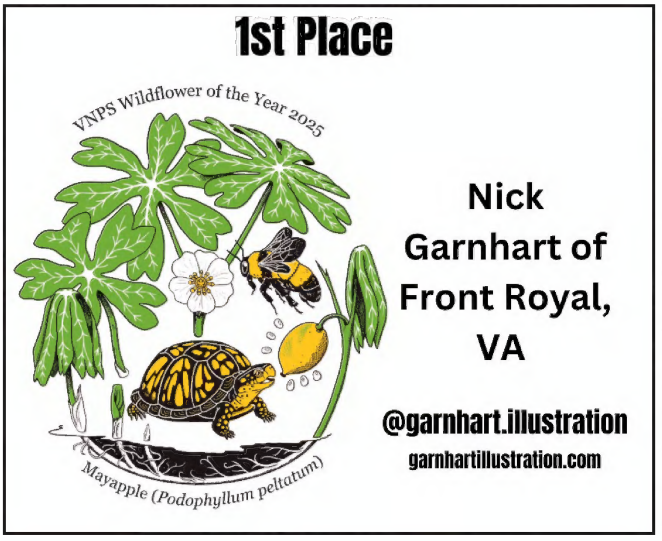
For Anna Finch, protecting nature and promoting native plants is more than a career; it's a journey shared with her community. With a hopeful and positive outlook, she embodies the spirit of inclusivity in conservation, demonstrating that collective action can lead to impactful change for people and the environment. Through her efforts, she aspires to inspire a diverse community to appreciate and protect the natural world, reminding us all that when we come together with open hearts, we enrich our lives and the lives of others around us in profound ways.

--Aaron Kershaw, VNPS Diversity, Equity, and Inclusion Chair

Winning artwork, annual meeting highlighted

From the President
Nancy Vehrs

Do you have your 2025 Wildflower of the Year shirt yet? We have a gorgeous shirt to celebrate our Wildflower of the Year, Mayapple, *Podophyllum peltatum*. As has become our tradition, publicity chair Ashley Moulton conducted an online T-shirt design contest to determine the artwork that would grace this year's shirt. For the second year in a row, our voting members decided on Nick Garnhart's lovely artwork. Nick lives in Front Royal and works for Virginia Working Landscapes, a program of the Smithsonian's National Zoo and Conservation Biology Institute. According to its website, "They support the VWL team as a field technician, conducting research on grassland birds and biodiversity, as well as creating scientific illustrations for the organization."



Nick has a BFA in Illustration, with a minor in environmental studies, from Virginia Commonwealth University. Nick wrote, "Learning about native plants has really opened my eyes to the amazing diversity that we have in Virginia. Each plant's own unique characteristics, life history, and how it contributes to the ecological, and human community fascinates me and makes me excited to learn more. Every plant species has a story, and it was so interesting to learn about Mayapples when I was creating this design; from the large native bees that pollinate the plant, to the box turtles that spread their seeds, to the rhizomes that create colonies of these spring plants, I have become infatuated with the nature of Mayapple." Congratulations, Nick! I've received many compliments on my shirt. To see more of Nick's work, visit their website at https://garnhartillustrations.com.

With 17 quality entries, competition for the winning design was intense. Second place went to Sadie Hall of Lexington, and we had a three-way tie for third place: Catherine McGuigan of Richmond, Kait Irving of Keswick and Katrina Pelikan of Richmond. Congratulations to our winners and to all the talented artists who sent entries.

In other news, we have a site and date for this year's annual meeting! Mark your calendar for the weekend of September 12-14 when we will hold the annual meeting at the Skelton 4-H Educational Conference Center at Smith Mountain Lake in Franklin County (https://skelton4hcenter.org/). Franklin County has two natural area preserves: Bald Knob and Grassy Hill. Descriptions from the Department of Conservation and Recreation's Natural Heritage Division website describes Bald Knob as follows: "Home to three globally rare natural heritage resources, Bald Knob has been a long-standing conservation priority for DCR in Virginia's southern Piedmont. The thin soils and sparsely vegetated rocks found on parts of the Preserve support vegetation assemblages different than any other documented site. Bald Knob Natural Area Preserve is the largest and best-known occurrence of a 'Piedmont mafic barren' where exposed rocks resist weathering and have unusual chemical properties, making them and their derived soils different from typical Piedmont sites."

Grassy Hill Natural Area Preserve is described as "a prominent landmark on the west side of the Town of Rocky Mount. The site is characterized by rocky slopes forested with hardwood species and scattered patches of Virginia pine. Shallow, basic, heavy-clay soils predominate, and outcrops of magnesium-rich bedrock are common. These unusual soil and rock substrates provide habitat for rare woodland communities. Several rare plants grow in small grassy openings near the hill's summit."

Watch your email for more news about our annual meeting.❖

Introducing new Virginia Natural Heritage Program staff

From Your Natural Heritage Program

By Anne Chazal
Chief Biologist

The Natural Heritage Program's biological Inventory Section is pleased to welcome two new full-time staff into two new positions: Gemma Milly as our new Staff Botanist and Mary Jane Epps as our new Natural Areas Biologist. They will join our team of professional botanists, vegetation ecologists, cave/karst scientists, and zoologists who scour the state for all that is rare and significant to our natural heritage and work to ensure its conservation.

Gemma Milly comes to us with over a decade of field botany and taxonomic experience. She has been involved with the Natural Heritage programs of New Jersey and Georgia as well as non-governmental organizations, and as a self-employed botanist. Gemma's experience includes expertise with and enthusiasm for several challenging taxonomic groups. She has extensive experience with the genus *Isoetes* (quillworts), a very difficult group to understand taxonomically. She also has expertise with bryophytes (mosses, liverworts, and hornworts), and significant experience with graminoid taxa, including obscure and in some cases rare sedges.

Milly joins Virgina Natural Heritage Program as the new Staff Botanist.

Her heritage experience involved performing field surveys and collecting vouchers, developing targets for state rare plant conservation, utilizing the BIOTICS database, and many others. She contributed to both state and global species ranks, developed rank specifications for occurrences of rare taxa, and developed provisional species ranks for bryophytes for South Carolina. These rankings are at the heart of all Natural Heritage programs and guide many conservation and protection efforts, as well as inform decision-makers in prioritizing spending and other actions.

Gemma will join VNHP's Senior Botanist, Johnny Townsend, and Field Botanist Jenny Stanley on the Botany Team. Her enthusiasm and experience will help us expand and improve on our knowledge of the flora of Virgina and make positive strides in its conservation.

Mary Jane Epps was most recently a tenured professor at Mary Baldwin University, teaching subjects including entomology, botany, conservation science, and field biology, and leading the curation of their entomology collections. She is an avid and talented all-around naturalist with strengths in botany, ecology, and zoology (including birds, herptiles, some fish, and entomology) and even some experience in spelunking. She has volunteered for our program by updating near-historical occurrences of rare species in the field.

This new position will focus on inventorying the flora, fauna,

Epps joins the Natural Heritage Program as the new Natural Areas Biologist. (Miscellaneous Media Photography photo)

and communities on our Natural Area Preserves (NAP), assisting with development of internal guidance for issues ranging from if/how to employ *ex situ* species conservation on NAP, to prescribed fire impacts on arthropods, and fostering strong ties with the research community to help us answer myriad questions about our NAP. Mary Jane brings extensive experience collaborating with university staff and students, government personnel, taxonomic experts, and citizen scientists as well as a strong foundation in scientific study design. This will be critical as we attempt to answer key management questions and measure the responses of our natural resources to management/restoration actions on our NAP.

Mary Jane will work alongside our entire inventory staff and closely with our NAP Stewardship staff and will be supervised by Chief Biologist Anne Chazal. We look forward to Mary Jane taking hold of a brand-new position and making it an opportunity to advance conservation and conservation science in Virginia.❖

Allodus podophylli: the infection cycle of Mayapple Rust

Article and images by W. John Hayden, Botany Chair

This article addresses the parasitic fungus, *Allodus podophylli*, that causes Mayapple Rust. This disease is extremely common throughout the entire geographic range of Mayapple, *Podophyllum peltatum*, the 2025 VNPS Wildflower of the Year. If you know what to look for, and if you spend just a little time looking carefully at Mayapple plants, you will almost certainly find this rust fungus on some of them. Is this situation cause for alarm? Is the long-term future of our beloved Mayapples threatened by this parasite? "No," is a reasonable response to these questions. Mayapple Rust does cause some degree of disfigurement to infected plants, but its effects are not devastating—more on this later—first, we will explore the fascinating biology of Mayapple Rust disease.

Let's start with some background on rust diseases in general. Rusts are classified among the Basidiomycetes, the same group of fungi that includes mushrooms, puffballs, and myriad other fungi. There are approximately 7,000 known species of rust fungi and every single one of them is a plant parasite (Kolmer et al. 2009). Unlike mushrooms and most familiar Basidiomycetes, however, rusts are not large fleshy fungi. In contrast, during most of their life cycle, rusts exist as microscopic chains of cells (hyphae) that grow in and among the cells of their hosts. At most, certain life cycle stages of rust fungi become visible as patches of discolored tissue on stems or leaves of their host plants (Figure 1). Via microscopy, these visible signs of infection will be found to consist of one or another kind of spore, microscopic cells that serve to propel the disease from one phase of infection to the next. Across the extensive diversity of known rust fungi, there is considerable variation in details of the parasite's life cycle. For rusts, life cycle and infection cycle are essentially the same thing.

Perhaps the best-known rust is the fungus that causes Black Stem Rust of Wheat. Black Stem Rust requires two different host plants to complete its life cycle; some stages occur on Barberry (*Berberis*) and others on Wheat (*Triticum*), and no less than five discrete phases of the parasite's activity take place every year. Because

(See Mayapple Rust, page 6)

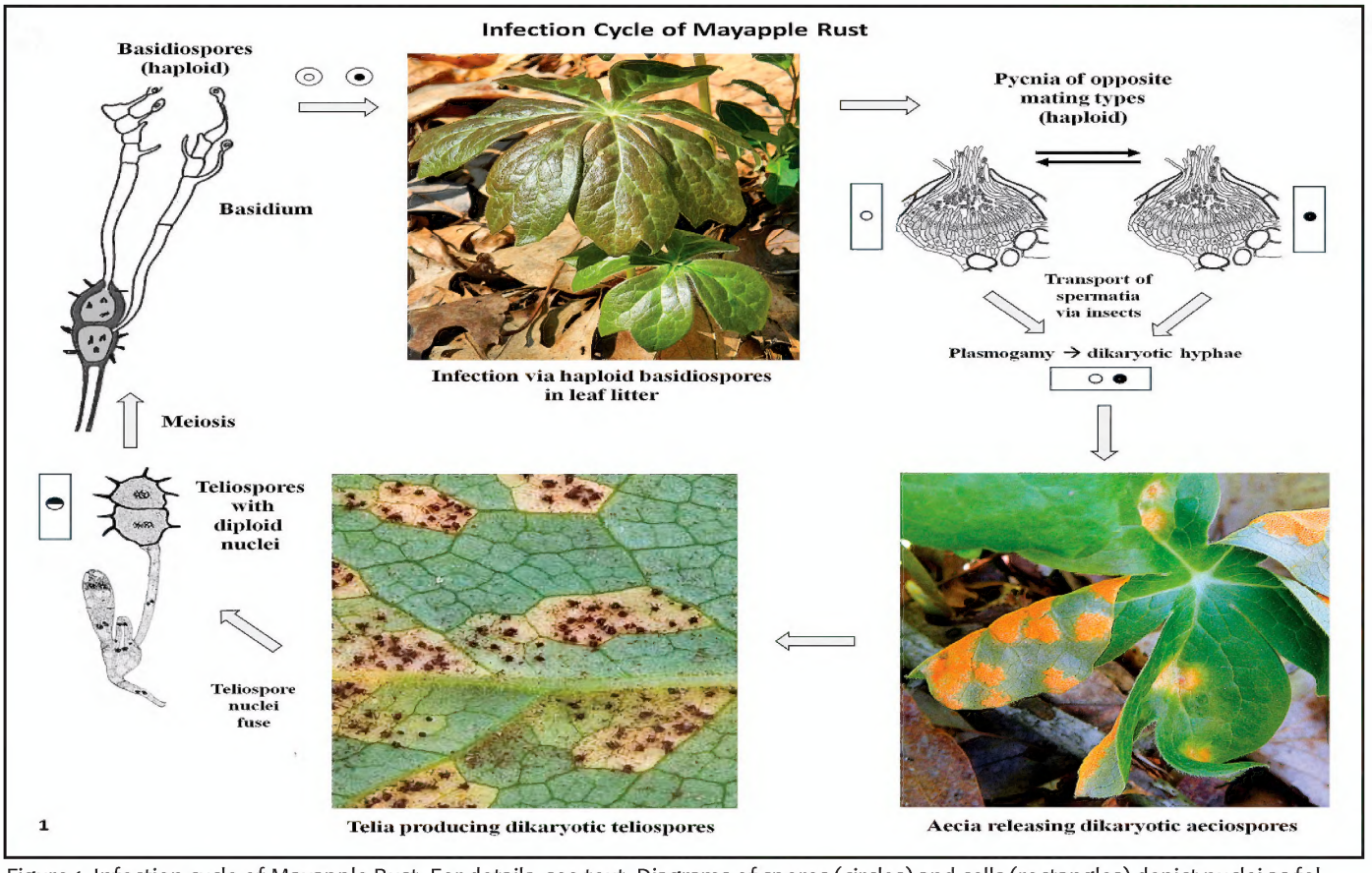
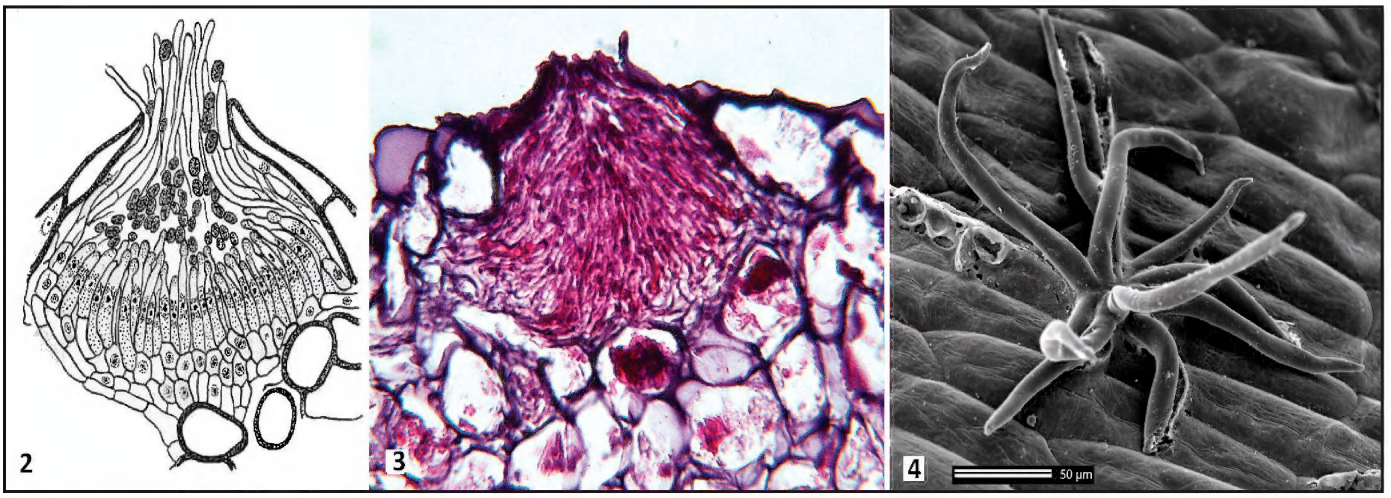


Figure 1. Infection cycle of Mayapple Rust. For details, see text. Diagrams of spores (circles) and cells (rectangles) depict nuclei as follows: white and black circles represent haploid nuclei of different mating types; half black and half white circle represents a diploid nucleus containing genes of both mating types. Telia photograph courtesy Alexey Sergeev (2025), other photographs by W. John Hayden; microscopic diagrams of pycnia from Bessey (1950), teliospores from Christman (1907), basidia and basidiospores from Torrey (1932).



Figures 2-4. Pycnia (spermagonia) of *Allodus podophylli* on the upper leaf surface of Mayapple. 2. Diagrammatic section, basal layer of hyphae with spermatia (dark single cells) and emergent flexuous hyphae, from Bessey (1950). 3. Photomicrograph by W. John Hayden. 4. Scanning electronmicrograph of emergent flexuous hyphae by W. John Hayden.

Mayapple Rust

(Continued from page 5)

Wheat is one of the most important food crops here on planet Earth, Black Stem Rust disease has been studied extensively and is well understood—it is not uncommon, for example, to find descriptions of its life cycle in college-level introductory botany and mycology textbooks. The situation with Mayapple Rust is a little simpler: there is just one host (Mayapple), and only four spore or spore-like stages. I have not been able to find any thorough accounts of the Mayapple Rust disease cycle that are accessible to natural history enthusiasts, neither in print nor on the internet. What follows is my synthesis of available information about the life (and disease) cycle of Mayapple Rust.

A brief note on nomenclature: The genus *Allodus* was first described and named by Orton (1916). However, throughout most of the 20th century, the fungus that causes Mayapple Rust has been known as *Puccinia podophylli*. Largely based on DNA evidence, coupled with certain details of its disease cycle, Minnis et al. (2012) resurrected the genus *Allodus* and Mayapple Rust, today, is known as *Allodus podophylli*.

A convenient starting point for any rust life/infection cycle is the basidiospore (Figure 1, upper left). As the name suggests, basidiospores are characteristic of Basidiomycetes. This type of spore is haploid, i.e., its nucleus contains only one copy of each kind of chromosome found in that species of rust. In the temperate zone, rust basidiospores are produced in the spring and these basidiospores initiate new infections on suitable host plants. Basidiospores will be present in the soil and leaf litter wherever Mayapple plants had been infected in the previous year. As new Mayapple leaves emerge from the perennial rhizomes, they contact basidiospores, and the infection begins. At first, basidiospores make chains of cells (haploid hyphae) that grow on the leaf surface. It is well known that many rust fungi gain entry to their host's interior by growing through the pores formed by stomates—most likely, this is the case for Mayapple Rust, too.

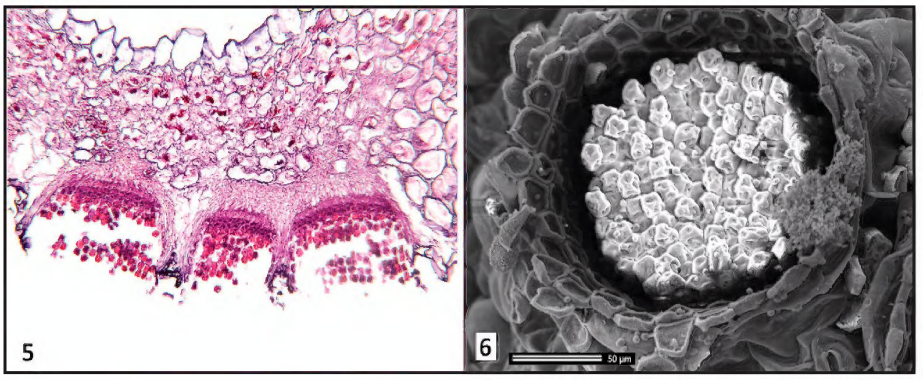
Once inside the leaf, rust hyphae proliferate among the photosynthetic mesophyll cells, some of which are penetrated by special short hyphal branches called haustoria. Since they are located within host cell cytoplasm, haustoria are surrounded by host molecules that represent food for the fungus; it is the function of haustoria to absorb nutrients from the host cell to support the relentless growth of more and more rust hyphae. In essence, Mayapple Rust converts Mayapple biomass to fungal biomass.

Not long after initial infection, haploid hyphae of Mayapple Rust form pycnia (Figure 1, upper right), structures that perform an essential function in the infection/disease cycle. Pycnia are also called spermagonia. These pycnia/spermagonia are flask-shaped masses of hyphae (Figures 2 and 3) that form below the leaf surface, with short, whispy, strands of hyphae that project above the leaf (Figure 4). Simply put, pycnia are the sex organs of rust fungi: hyphae inside the pycnium make numerous unicellular spermatia (Figure 2) that function as male gametes and the flexuous hyphae that extend above the pycnium (Figure 4) function as female gametes. For mating to occur, spermatia from one site of infection must find their way to the flexuous hyphae of another pycnium that is of slightly different genetic constitution. In other words, successful mating will occur only between spermatia and flexuous hyphae of distinctly different mating types. But the tiny little spermatia have no means of locomotion, so how do they make their way

from one pycnium to another? Much like pollination of flowers, insects provide the assistance needed. Pycnia secrete a small droplet of sweet liquid, often referred to as nectar, which prompts various small insects to visit multiple pycnia, consume nectar and, incidentally, carry spermatia to and fro among infected Mayapple plants. With the help of insects, some spermatia contact flexuous hyphae of suitable opposite mating type.

Having reached the point at which haploid male and female structures find themselves in close proximity, one might expect some sort of straightforward fertilization process to occur, producing a diploid zygote. BUT NO, that is NOT the case for most fungi, nor is it the case for the rusts! What happens in fungi, in general, is that cells of opposite mating type only partially fuse; the cytoplasm of the two different cells intermingle, but their nuclei remain separate. This process of partial fusion is known across the fungi as plasmogamy, and the resulting cell, containing two haploid nuclei that are genetically a little different from each other, is described as dikaryotic (literally, two-nucleate). To summarize, using proper mycological terms, it is the function of Mayapple Rust pycnia to facilitate plasmogamy, resulting in the formation of dikaryotic hyphae. Once formed, dikaryotic hyphae grow prolifically, make more nutrient-gathering haustoria, and extend the infection into larger and larger portions of the Mayapple leaf. As each dikaryotic cell divides, two daughter cells that also have two nuclei are formed. In this fashion, dikaryotic hyphae proliferate at the expense of nutrients present in healthy Mayapple tissue.

Once the dikaryotic hyphae of Mayapple Rust have gleaned sufficient nutrients from their Mayapple host, they take on a new pattern of growth and a new, aecial, phase of infection



Figures 5-6. Aecia and aeciospores of *Allodus podophylli*. 5. Three aecia emergent from the lower leaf surface of Mayapple, photomicrograph by W. John Hayden. 6. Scanning electronmicrograph of one aecium, by W. John Hayden.

becomes manifest. These aecia are spore-making structures that grow in tight clusters on the underside of Mayapple leaves (Figure 1, bottom right). Cells of the aecium and the numerous spores it produces are still dikaryotic, i.e., containing two nuclei of different mating types. This aecial stage is, perhaps, the most easily observed sign of Mayapple Rust infection. Aecial clusters are bright yellow or yellow-orange, and the discolored patches are easy to see on both surfaces of the leaf. Each aecium has a cylindrical shape. When mature, the aecium dries somewhat, causing its convex apex to open, which permits release of dikaryotic aeciospores into the air (Figures 5 and 6). Each dispersed aeciospore that lands on an uninfected Mayapple leaf can initiate a new infection. Aeciospores increase the number of infected plants, setting the stage for the next events in the disease cycle.

Sometime after the aecial stage, but before Mayapple leaves begin to senesce, as they typically do by mid- to late-summer, yet another phase of the infection cycle appears: telia and teliospores (Figures 1, bottom center, bottom left). Like the aecia, telia of Mayapple Rust emerge from the lower epidermis. Each telium consists of a small cluster of relatively simple sporangia; there is a short hypha that serves a stalk terminated by two enlarged cells, the teliospores. In Mayapple Rust, groups of telia tend to be confined to discrete polygon-shaped areas defined by the net-like pattern of leaf veins (Figure 1 bottom center). Presence of telia can often be predicted by casual observation from above because the telium-bearing zones turn yellow as a result of the rust's nutrient-scavenging activity. The result is a tile-like pattern of discolored zones on Mayapple leaves. Teliospore formation tends to occur as Mayapple leaves undergo their normal summertime senescence, so it is easy, indeed, to misinterpret the telial stage as normal late-season senescence of Mayapple leaves.

Initially, each teliospore is dikaryotic, i.e., each of the two spore cells contains two nuclei of opposite mating type. As each teliospore becomes mature, however, its two haploid nuclei fuse together in a process called karyogamy, yielding a single diploid nucleus in each of the teliospore cells. Mature diploid teliospores are thick-walled and in Mayapple Rust, the thick walls are beset with small spine-like projections (Figure 7). Arthur (1934) characterized the teliospore stalks as fragile; presumably, then, teliospores drop into the leaf litter that covers the forest floor beneath the canopy of late-season Mayapple leaves. Here, the teliospores remain dormant until the following spring.

Final stages of Mayapple Rust

(See Mayapple Rust, page 8)

Mayapple Rust

(Continued from page 7)

infection cycle occur as new Mayapple plants emerge from winter dormancy. Teliospore germination is coupled with the process of meiosis: each diploid teliospore nucleus undergoes meiosis, two successive cell divisions after which each of the resultant four daughter nuclei contain just one of each kind of chromosome present in the Mayapple Rust genome. As meiosis proceeds, a short, thread-like, hypha emerges from the teliospore and becomes occupied by the four haploid nuclei. Soon the four haploid nuclei are separated from each other via new cell walls; mycologists interpret the resultant structure as equivalent to the basidia present in more familiar Basidiomycetes like the mushrooms and puffballs. Rust fungus basidia (Figure 1, upper left), however, are distinctly linear, not club shaped as in most mushrooms. Along with a bit of cytoplasm, each haploid nucleus squeezes through a small protuberance on the side wall of the rust basidium and, thus, becomes a basidiospore—which is precisely where this description of Mayapple Rust disease cycle started.

As described above, the life/infection cycle of Mayapple Rust shares many similarities to that of Black Stem Rust of Wheat. All the structures and disease stages of Mayapple Rust have direct counterparts in Wheat Rust. Unlike Wheat Rust, however, Mayapple Rust infects only one host and there is one other important difference—Mayapple Rust lacks structures called uredia and urediospores that are important in the dynamics of Wheat Rust infections. On the other hand, Mayapple Rust has a few of its own unique peculiarities. In addition to the sequence of events described above, it is well-documented that early season telia can be found on the ephemeral bud scales that surround and accompany photosynthetic leaves as they emerge in spring. Further, early season telia have been documented on Mayapple sepals that are shed promptly as flower buds first open. At least on rare occasions, early season telia co-occur with pycnia and aecia. Interpretation of early season telia has been controversial, but it may be the case that early spring infections on bud scales and sepals simply have access to far fewer host nutrients than infections occurring on more nutritious photosynthetic leaves. Perhaps under what might amount to starvation conditions for rust, progress to the telial phase is greatly accelerated on these nutrient-poor ephemeral plant organs. There is also a related controversy from early 20th-century literature whether Mayapple Rust hyphae ever persist within the perennial rhizomes and resting winter buds of Mayapple plants.

Based on studies of the infection dynamics of Mayapple Rust, Parker (1988) has concluded that Mayapple bud scales protect foliage leaves of the plant from devastating levels of infection. Bud scales enclose the earliest stages of leaf growth and, according to Parker, emerging leaves are thereby shielded, to some extent, from contact with basidiospores. The protection is not absolute, some infections of leaf tissue do occur. But when Parker experimentally peeled back bud scales, exposing the earliest stages of leaf growth to basidiospores in soil and leaf litter, treated plants suffered much more severe rates of infection than plants with bud scales left intact. Overall, Parker reports infection rates of 11 percent, or less, even in large, genetically uniform, clonal, populations of Mayapple.

Bottom line: Mycologists have been studying Mayapple Rust for well over a century now, and all indications are that, while this parasitic disease is common and widespread, there is no evidence that it poses an existential threat to one of our most beloved spring ephemeral wildflowers. So, do not be alarmed when you notice rust fungi on Mayapples—take a moment to contemplate the complexities of nature and wonder at the bizarre biology of parasitic rust fungi! ❖

Figure 7. Photomicrograph of teliospores of *Allodus podophylli*, courtesy Alexey Sergeev (2025).

LITERATURE CITED

Arthur, J. C. 1934. Manual of the rusts of the United States and Canada, xv + 438 pp., 487 figs. Purdue Research Foundation, Lafayette.

Bessey, E. A. 1950. Morphology and taxonomy of fungi. The Blackston Co., Philadelphia.

Christman, A. H. 1907. The alternation of generations and the morphology of the spore forms in the rusts. Botanical Gazette 44: 81-101.

Kolmer, J. A., M. E. Ordonez, and J. V. Growth. 2009. The rust fungi. In: Encyclopedia of Life Sciences, John Wiley & Sons, Ltd., Chichester.

Minnis, A. M., A. R. McTaggart, A. Y. Rossman, and M. C. Aime. 2012. Taxonomy of mayapple rust; the genus *Allodus* resurrected. Mycologia 104: 942-950.

Orton, C. R. 1916. North American species of *Allodus*. Memoires New York Botanical Garden 6: 171-208.

Parker, M. A. 1988. Genetic uniformity and disease resistance in a clonal plant. American Midland Naturalist 132: 538-549.

Sergeev, A. 2025. *Puccinia podophylli*. https://www.texasmushrooms.org/en/puccinia_podophylli.htm Accessed March 2025.

Torrey, R. E. 1932. Plate XXXVII, from A set of botanical drawings for laboratory use. Published by the author.

Campaign makes native plant knowledge accessible

Clockwise from left, *Vaccinium pallidum*, *Dryopteris marginalis*, *Viburnum prunifolium*. All photos by Gary P. Fleming.

In times of plenty and, especially, in times of scarce resources, collaboration between organizations and individuals with common purpose and goals becomes a clear path toward accomplishing results. It makes sense financially, but it also solidifies a sense of community and inclusion in larger projects that matter. It is an opportunity for our members to have an impact – however small it may seem – on tackling issues that may appear overwhelming to each of us separately.

All our fundraising campaigns have this idea at their core. Our 2024 fundraiser is a good example of collectively prioritizing initiatives that are in line with our mission.

When we asked our members and friends to consider supporting the Digital Atlas of Virginia Flora last fall, we were hoping for a solid response. And we got it. At the completion of

(See Campaign, page 12)

VBA thanks VNPS for supporting the Digital Atlas of Virginia

It is time for a big thank you to the VNPS membership from the members of Virginia Botanical Associates (VBA) for supporting the Digital Atlas of the Virginia Flora during this year's annual fundraiser. The recently completed campaign met and exceeded the $50,000 goal, allowing us to fix and upgrade basic components of the website and create new functions that will make it a more valuable resource.

Since the 1970s, the Atlas has been an indispensable resource for keeping track of the flora of our state, eventually providing the basic data for building the well-known *Flora of Virginia*. Our web resource provides a record of plant geography that evolved from hard copy form to the familiar digital format as technology became available. The existing site was built very simply and many years ago, so even the foundation of the Atlas needs shoring up and key components replaced. The generosity of VNPS members will help us meet those basic needs and move forward in new ways.

By helping us sustain this decades-long effort, you are supporting a very dynamic and up-to-date resource. The county distribution maps are the most obvious and recognizable feature of the atlas; they change almost daily based on new collection data. But we are also able to make name changes, add newly described species, and document evolving species concepts at any time. Because of our strict requirements for herbarium vouchers, our data meet the highest standards for accuracy.

A little-known fact is that the Atlas is used by botanists in many other states and countries. Getting accurate botanical data can be tough sometimes given the free-wheeling ways of the web, and scientists everywhere are on the lookout for a resource they can trust. Our vast collection of high-quality plant images are a big part of this. Searching the web for correctly identified plant photos is a real gamble. Our site provides a stable, reliable and very attractive alternative.

I am always impressed by the support VNPS gives to botanical research, including efforts to document and protect our flora. Your support for the Digital Atlas of the Virginia Flora helps ensure a solid foundation for understanding our native species as well as the new arrivals that are increasingly changing our landscape. Thank you once again for showing you value basic science and share our fascination with an ever-evolving flora.

--John Townsend, Senior Botanist Natural Heritage Program and VBA President

Projects on Violets, Fones Cliff flora awarded grants

Dr. Harvey Ballard and Research Assistant Collin Thacker at Rocky Knob, VA.

The VNPS Board is happy to announce the awardees of the 2025 VNPS Grant Program. To be considered, all proposals must focus on Virginia's native flora as stated on the VNPS website and all did so this year. Nearly all the proposals we receive every year are worthy of funding, but the Society's funds allow only about $15,000-$25,000 to be awarded each year. For 2025 we received eight proposals requesting over $81,000, and every single one was worthy of funding – fascinating, well written, and focused on native Virginia flora in some manner. Several grants were in support of students. Five reviewers carefully read and scored each proposal on its merits and projected contribution to Virginia's native flora as well as the research design, involvement of other researchers, inclusion of undergraduate and graduate students and other such criteria.

The scores among reviewers were close, but two proposals stood out above all the others and the VNPS Board choose these two to support in 2025. One grant for $11,805 was awarded to Dr. Harvey Ballard, Professor of Plant Systematics and Evolution and Director of the Floyd Bartley Herbarium at Ohio University. His proposal, "A Taxonomic Treatment of the Violets (Violaceae) Of Virginia And North Carolina," is a continuation of a multiyear study of the violet species complex found throughout Virgina and North Carolina.

Dr. Ballard began studying violets over 45 years ago with a concentration on eastern North American violets (*Viola* spp.). You may have heard his fabulously fascinating violet presentation earlier this year during the VNPS Workshop – the workshop was recorded and is available at "https://vimeo.com/showcase/11643730" if you missed it. Ballard has spent vast hours doing field work, examining herbarium specimens as well as raising violets in the lab while studying all aspects of systematics, phylogenetics, molecular ecology, population, and conservation genetics.

In addition to writing extensively in scientific publications about violets, he maintains a most interesting website for the violet lover/scientist - "Violets of the Great Plains and Eastern North America." For the past few years, he has concentrated on the extensive violet diversity in Virginia and North Carolina with the goal of publishing a full taxonomic treatment of violets in the two-state region. Support from the VNPS will help to allow Dr. Ballard and his field assistant(s) to spend this summer collecting in southeastern, southwestern, and northern Virginia. In the fall and winter, he plans to work with students to complete taxonomic studies on undescribed taxa that grow mostly in Virginia, preparing one or more manuscripts for the journal *Castanea* on the new species. All the data and Virginia violet specimen records will be shared with Virginia's Division of Natural Heritage to update the Digital Atlas of the Virginia Flora. VNPS is proud to fund such an undertaking of such a widespread plant in the Commonwealth.

A Monacan Violet described in 2023 by Dr. Ballard as one he found in the Blue Ridge Mountains.

The second grant of $8,482 was awarded to Dr. Doug DeBerry and Sam Dutilly of William & Mary. Dr. DeBerry is a research assistant professor in the Environment and Sustainability Program and Sam is his graduate student. This grant will fund a study of the "Vascular Flora of Fones Cliffs, Virginia, and Novel Habitat Enhancement Method for the Preservation of Sensitive Joint Vetch, *Aeschynomene virginica*." Fones Cliffs is a phenomenal four-mile stretch of white-colored diatomaceous cliffs that rise over 100 feet above the lower coastal plain portion of the Rappahannock River. This site is recognized as a globally significant area for migrating and wintering birds, especially Bald Eagles, and is designated an Important Bird Area (IBA) by the National Audubon Society. This area was part of the ancestral lands of the Rappahannock Indian Tribe and was recently reacquired by the tribe. This returned Indian land at Fones Cliff totals 969 acres and is

Dr. Doug DeBerry and Sam Dutilly at Fones Cliff.

now referred to by its historic Native American name of Wecuppom. An easement on this land is being held by the Rappahannock River Valley National Wildlife Refuge. It should be noted that the purchase involved the U.S. Department of the Interior, the U.S. Fish and Wildlife Service, the Chesapeake Conservancy and the Conservation Fund. A large and pristine freshwater tidal marsh, Beverly Marsh, is also a study site under this grant. This privately owned marshland is directly across the Rappahannock from Fones Cliff.

Dr. DeBerry has been studying Virginia flora in one aspect or another for more than 30 years, having completed his undergraduate work at the University of Virginia and his Ph.D. at the Virginia Institute of Marine Science. While wetland botanical research has been a major focus for Dr. DeBerry, he has conducted research and published on such subjects as the Virginia Pollinator-Smart Solar Industry, the ecological considerations in living shorelines, the impacts of invasive plants on native vegetation communities in wetland and stream mitigation, and a floristic inventory of the James River Park System in Richmond.

Dutilly is pursuing his master's degree with a focus on the flora of Fones Cliff including emphasis on the federally threatened plant, Sensitive Joint Vetch, *Aeschynomene virginica,* which has a significant population in this Fones Cliff region. Sam is pursuing a master's degree, and this research forms the basis of that work. Sam graduated from William & Mary in 2023 with a degree in biology and environmental science. While an undergraduate he performed conservation research and biodiversity preservation in Mexico during summers.

This project has three primary objectives: 1) conducting a comprehensive floristic inventory of Fones Cliffs; 2) mapping community diversity and degraded sites on Fones Cliffs; and 3) enhancing the understanding of the Sensitive Joint Vetch through experimental competition removal plots. The research will be invaluable to the tribe for its long-term goal of restoration of degraded ancestral lands. Further, this project will be valuable in documenting the ecological community diversity at Fones Cliffs while increasing our understanding of the Sensitive Joint Vetch. This vetch inhabits Freshwater Tidal Marshes in about 20 localities along a small portion of the mid-Atlantic from New Jersey to North Carolina. Historic populations of this vetch in Pennsylvania and Delaware are now considered extinct.

VNPS began this grant program in 2015, with goals to "advance our understanding of the biology of native plants and their relationship to their ecosystems; teach students about the importance of native plants and habitat preservation; measure the benefits of native plant habitats to the economic and environmental health of the Commonwealth; or address similar topics." A list of issued grants is available on the VNPS website under Resources. Many of the VNPS Spring Workshops and our VNPS annual meetings include presentations by our grant awardees. Watch for announcements about both these gatherings.

VNPS has awarded over $130,000 to principal investigators and students from a variety of academic institutions and non-profit organizations. Information about the research grant program can be found under Resources on the VNPS website or by emailing **grantmanager@vnps.org**. Proposals for 2026 funding will be accepted from December 1, 2025, to the deadline of February 1, 2026.
--Kevin Howe, 1st Vice President and Acting Grants Manager

A portion of Fones Cliff as seen from the Rappahannock River.

Campaign supports Digital Atlas

(Continued from page 9)

the campaign, we were able to send a check for $51,734 to *Virginia Botanical Associates* to support a complex improvement project benefiting the Digital Atlas.

The funds we raised will propel a series of improvements in the overall site design. It feels satisfying knowing that our members' contributions can accomplish so much.

We are touched by the generosity of all who contributed. Thanks to each and every one of you for trusting VNPS to select meaningful and impactful projects for support. Every single donation matters because it demonstrates our commitment to what we value highly as a community – native plants and their habitats, as well as spreading information and knowledge to all who want to learn more about them and are committed to living their lives in respect for nature. Thank you also to all chapters who committed resources from their budgets to support the fundraiser. We know it is not easy to make these decisions when local priorities demand attention and we are grateful to them for doing their part. Finally, huge gratitude is owed to all members of the board who helped ensure that we put together and implemented a successful campaign.

Conserving native plants and wild spaces can take different forms. Supporting the Digital Atlas of Virginia Flora is part of our joint commitment to educating others about our state's precious natural resources that cannot be taken for granted. Many of us use the Atlas regularly, if not daily, and are looking forward to its upgraded version – a powerful and user-friendly tool at our fingertips that reflects new research and discoveries but still preserves century-old data about our diverse flora. The improved and strengthened Digital Atlas of Virginia Flora will serve more efficiently all our members and others who want to learn about native plants.

-- *Emilia Godwin, VNPS Fundraising Chair*

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